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Tropical Cyclone Intensity Change

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LONG-TERM GOALS

My long-term goal is to better determine the relationship between observed environmental wind shear and TC intensity change in order to improve prediction.

OBJECTIVES

The primary objectives are to better understand the relationship between vertical shear and TC intensity using observations, and develop methods to quantitatively analyze the shear using high-resolution satellite data.

APPROACH

Our approach is to collect a large, multi-basin database matching TCs with coincident environmental shear fields developed at UW-CIMSS. These analyses incorporate the most advanced satellite wind observations. We plan to conduct a thorough investigation and statistical analysis of the tendencies in the shear vs. TC intensity. We will examine other parameters in this relationship such as latitude, storm size and potential intensity. From the statistical analysis, we hope to derive a formula or statistically based shear model that can be used by JTWC and/or naval operational forecasters. Chris Velden, PI and Gregg Gallina, an MS student are involved in this project.

WORK COMPLETED

The databases for the Western Atlantic, and Eastern/Western Pacific basins have been assembled. Statistical analysis is underway on these datasets. Several case studies have been identified and qualitatively analyzed.

RESULTS

The case study analyses suggest a relationship exists between environmental shear and time-lagged TC intensity change. The relationship appears to be a function of current and potential intensity, and the strength of the shear. Since the statistical analysis has just commenced, there are not any quantitative, conclusive results as of yet.

IMPACT/APPLICATIONS

Applications of this research will result in a quantitative TC intensity forecast method for JTWC/naval forecasters to utilize as objective guidance.

TRANSITIONS

Real-time fields of vertical wind shear and tendency are already being disseminated from CIMSS to JTWC for qualitative use and evaluation. Initial feedback has been very positive. The objective model will be delivered next year after the statistical analysis is completed.

RELATED PROJECTS

The UW-CIMSS shear fields have been tested for impact in the operational SHIPS model, which is an intensity prediction scheme developed by Mark DeMaria of NESDIS. The initial tests did not show conclusive impact on the SHIPS forecast accuracy. Further collaboration with DeMaria is underway.

REFERENCES

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